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ORIGINAL RESEARCH

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A longitudinal study of the Swedish MD Anderson Dysphagia Inventory in patients with oral cancer

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Abstract

Objective: The aim of this study was to investigate whether the Swedish MD. Anderson Dysphagia Inventory (MDADI) is able to detect changes in dysphagia symptoms over time for patients with head and neck cancer (HNC).

Methods: One hundred and forty-two patients with resectable tumors of the oral cavity were included prior to treatment. The patients filled out the MDADI, European Organization for Research and Treatment of Cancer Quality of Life questionnaire Core 30 (EORTC QLQ-C30) and the HNC module (H&N35) at baseline and at least one follow-up at 6 and/or 12 months after oncologic treatment. A control group without dysphagia (n = 115) was included.

Results: Self-perceived swallowing function decreased in all domains at 6 months, and improved between 6 and 12 months. The changes were similar to the changes of the EORTC domains, indicating a sensitivity to change. However, even if improvements were seen at 12 months, the values were still inferior compared to baseline values, and the values of a control group without dysphagia. Convergent validity was found with values of the MDADI and EORTC domains producing similar results, and moderate correlations as hypothesized. Patients with moderate-severe dysphagia according to the MDADI (<60 points) demonstrated inferior values of the EORTC domains compared to patients with scores above 60 points.

Conclusion: The Swedish MDADI was found to be sensitive to change, and showed convergent results when compared to other established instruments. The threshold value for the MDADI (<60 points) indicating moderate-severe dysphagia may be a valuable addition in the clinical use.

Level of Evidence: 1.

KEYWORDS

deglutition disorders, head and neck neoplasms, quality of life, questionnaires, validation studies

1 | INTRODUCTION

Swallowing difficulties is a common side effect following oncological treatment for head and neck cancer (HNC). Studies show that 40% of patients experience dysphagia up to 3 years following completion of treatment.[1,2] Patients with tumors of the tongue have been found to have the worst functional dysphagia quality of life scores compared to other subsites of the oral cavity, while patients with tumors of the buccal mucosa demonstrate the worst overall scores using the MD. Anderson Dysphagia Inventory (MDADI).[3] Swallowing problems are often associated with reduced health related quality of life (HRQL), morbidity, anxiety and depression.[3,4]

Dysphagia is often monitored through functional assessment of swallowing ability, by for example videofluoroscopy or fiberoptic endoscopic evaluation of swallowing. In addition to this, instruments to measure the degree and impact of dysphagia are useful when evaluating the treatment and rehabilitation outcome and needs. Several different instruments exist, including the Eating assessment tool-10 item version (EAT-10),[5] the Sydney Swallow questionnaire (SSQ),[6] the Swallowing Quality of Life questionnaire (SWAL-QOL)[7] and the MDADI.[8] The MDADI is advantageous as it is developed specifically to evaluate the impact of dysphagia on HRQL for HNC patients. Additionally, the instrument is relatively short, only 20 items, when compared to SWAL-QOL (44 items) or the Dysphagia Handicap Index (30 items).[9] The MDADI has been translated to Swedish and validated,[10] which found it to be a valid and reliable instrument. However, the Swedish version has not yet been used longitudinally, and therefore, the sensitivity to change, that is, responsiveness, has not been evaluated. The ability of an instrument to measure a change in state, responsiveness, should be included in the validation process of an instrument. An instrument should be reliable and result in similar results when a patient is stable, but it should also respond to changes in their condition, which allows for longitudinal use. Additionally, a total score below 60 points of the MDADI has been found to indicate moderate to severe dysphagia.[11-13] This threshold value has not previously been used and evaluated in a Swedish population.

The aim of this study was to investigate whether the Swedish MDADI is able to detect changes in dysphagia symptoms over time for patients with HNC. Additionally, the study aimed to evaluate the suggested threshold value for the MDADI, indicating moderate to severe dysphagia (<60 points).

2 | MATERIALS AND METHOD

2.1 | Participants

Participants in the present study are part of the ARTSCAN II-study. The ARTSCAN II is a Swedish multicenter randomized controlled study aimed to compare the efficiency of preoperative accelerated radiotherapy followed by surgery with surgery followed by postoperative radiotherapy, including chemotherapy for high risk resectable tumors in the oral cavity. Preliminary data with respect to loco-regional control and survival have been presented.[14] Patients with T1-T4 and/or N0-3 tumors were included. In total, 250 patients were included in the study of which six (n = 6) patients withdrew their consent leaving 244 patients eligible for the ARTSCAN II-study. In the present longitudinal study of the MDADI, only patients who had filled out the MDADI at baseline and on at least one more occasion were included. Therefore, a total of 142 patients could be included in the present study, where the remaining 108 participants were excluded due to insufficient MDADI data.

Data was collected at baseline (prior to start of oncologic treatment, that is, surgery or radiotherapy) and patients were randomized to receive either preoperative or postoperative radiotherapy. Additional follow-ups were at 6 and 12 months after randomization. Questionnaires were either given directly to the patients, in connection to the hospital visit or sent by e-mail from the study center.

A control group without dysphagia (n = 115) was included for comparison purposes. These participants were recruited when visiting the Otorhinolaryngology department at the Sahlgrenska University Hospital for reasons such as symptoms from the ears, nose, sinuses or benign skin tumors. The control group without dysphagia filled out the same instruments as the study patients but they only filled them out once.

2.2 | Oncologic treatment

Patients were randomized 1:1 between the two trial arms. Preoperative radiotherapy was administered as hyperfractioned radiotherapy, twice daily with 2 or 1.1 Gy per fraction, totaling 68 Gy. The surgery was preferably performed within 4-6 weeks post-radiotherapy completion. Postoperative radiotherapy was given as conventional radiotherapy once daily in doses of 2 Gy per fraction to a total of 60-66 Gy (60 Gy to histopathological low risk patients and 66 Gy + weekly Cisplatin to high risk patients). Postoperative radiotherapy was given at the latest 6 weeks after surgery.

2.3 | Patient demographics

All patients answered questions for example regarding age and smoking habits. Further details regarding treatment and tumor characteristics including WHO Performance status are described in Table 1.

2.4 | M. D. Anderson Dysphagia Inventory

The M. D. Anderson Dysphagia Inventory (MDADI) evaluates the impact of dysphagia on the health-related quality of life (HRQL) of patients who have undergone treatment for HNC. It was originally designed by Chen et al, and has been found psychometrically valid and reliable.[8] It has been translated into several languages, including Swedish. The Swedish MDADI was found to be valid (Crohnbach's alpha 0.77-0.88) and have reliable test-retest correlations (ICC = 0.83-0.97).[10]

TABLE 1 Patient demographic at baseline (before oncologic treatment) and corresponding data for control group without dysphagia

	Patients (n = 142)	Control group without dysphagia (n = 115)	Comparison between groups
Age; mean (SD)	63.5 (10.6)	63.0 (13.6)	ns
	n (%)	n (%)	
Gender			
Male	90 (63)	66 (57)	ns
Female	52 (37)	49 (43)	
Smoking habits at baseline			
Non-smoker	100 (71)	106 (92)	0.002
Smoker	32 (22)	9 (8)	
Missing data	10 (7)	0 (0)	
Tumor localization		n/a	n/a
Tongue/floor of mouth	95 (67)		
Other location in oral cavity	47 (33)		
Tumor stage		n/a	n/a
Early (Stage I-II)	75 (53)		
Advanced (Stage III-IV)	67 (47)		
WHO performance status[a]		n/a	n/a
0	126 (89)		
1	11 (8)		
2	3 (2)		
3	0 (0)		
Missing	3 (2)		

Note: ns, nonsignificant, that is, $P > .05$. n/a, non-applicable.
[a]The WHO performance status classification: 0: able to carry out all normal activity without restriction. 1: restricted in strenuous activity but ambulatory and able to carry out light work. 2: ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours. 3: symptomatic and in a chair or in bed for greater than 50% of the day but not bedridden. 4: completely disabled; cannot carry out any self-care; totally confined to bed or chair.

The instrument encompasses four domains consisting of 20 items as well as total score. The Global domain illustrates how the patient is limited in their day-to-day activities due to their swallowing disorder. The Emotional domain (6 items) indicates the patient's emotional response to the swallowing disorder. The Functional domain (5 items) measures the effect of the patient's swallowing problem on daily activities, and the Physical domain (8 items) represents the patient's perception of the swallowing difficulty. Each item is rated on a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). The Global domain is presented separately, while a sum of the other domain scores and a mean score of all other domains are calculated and converted to scores ranging from 20 (extremely low functioning) to 100 (high functioning); i.e. a higher score indicates a better HRQL. A 10-point difference in the total score between groups has been found to respond to meaningful between-group differences in swallowing function.[15] A total score below 60 has been suggested to indicate moderate to severe dysphagia and was tested in the present prospective longitudinal study.[11]

2.5 | Study specific questions

Four study-specific questions regarding eating and swallowing were included, described in detail in Table 2. These items were answered, calculated and presented in the same way as the items of the MDADI. Therefore, a high value corresponds to a high (good) function.

2.6 | The European Organization for Research and Treatment of Cancer Quality of Life questionnaires

The cancer-specific questionnaire European Organization for Research and Treatment of Cancer Quality of Life questionnaire Core 30 (EORTC QLQ-C30) consists of 30 items that describe symptoms and functional level. Additional symptoms associated specifically with HNC and its treatment is included in a complementary 35-item module, the EORTC QLQ-H&N35.[16,17] Calculated domain scores range from 0 to 100. On the functioning domains and global quality of life domain, a score of 100 represents maximum functioning, whereas on the symptom domains and single items a score of 100 equates to worst possible symptoms. In this study, it was hypothesized a priori which domains of the EORTC QLQ-C30 and H&N35 would correlate to the MDADI domains. Moderate correlations between the following domains of the EORTC QLQ-C30 and H&N35 and the different MDADI domains were hypothesized: Role function, Social function, Emotional function, Global QOL, Swallowing, Social eating, Social contact and Sticky saliva. Only the hypothesized domains are included in the present study.

2.7 | Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki, and was approved by the Regional Ethical Review Board in Umeå Sweden on the eighth January 2008 (ref: 07-178M). It was then approved by the heads of participating centers. The study was announced at http://www.controlled-trials.com/ISRCTN00608410. All participants signed written informed consent before inclusion in the study.

2.8 | Statistical analysis

Descriptive statistics are presented as means and standard deviations (SD) for continuous variables, and numbers (n) and percentages (%) for

TABLE 2 Mean values (SD) for study specific items before treatment (baseline) and follow-up and *P*-values and effect sizes for changes at follow-up compared to baseline and previous study occasion

	Baseline (n = 142) Mean (SD) min-max	6 months (n = 138) Mean (SD) min-max *P value* compared to baseline	12 months (n = 121) Mean (SD) min-max *P value* compared to baseline/*P* value compared to 6 months	Control group without dysphagia (n = 115) Mean (SD) min-max
It hurts when I eat, drink, swallow	69.5 (31.7) 20-100	67.4 (30.6) 20-100 Ns	78.2 (27.8) 20-100 .036/.001	99.3 (3.6) 80-100
The food gets stuck when I swallow	89.5 (19.8) 20-100	71.7 (27.9) 20-100 *<.001*	78.6 (28.7) 20-100 *<.001/.026*	98.3 (8.2) 40-100
I have trouble swallowing because my mouth and throat are dry	89.9 (19.4) 20-100	63.0 (29.5) 20-100 *<.001*	64.8 (30.1) 20-100 *<.001/ns*	99.5 (3.2) 80-100
I need to rinse down what I eat to be able to swallow	84.9 (24.7) 20-100	56.2 (28.8) 20-100 *<.001*	61.0 (30.1) 2 0-100 *<.001/.008*	98.1 (8.8) 40-100

Note: For the study specific items, 100 indicates the most favorable state, 20 the least favorable. *P*-value compared to baseline, and at 12 months also compared to 6 months. Comparison between patients and control group without dysphagia revealed $P < .05$ in all study specific items and occasions. ns, nonsignificant.

TABLE 3 Data regarding weight and weight loss in all study occasions for the patients in the study group

	Baseline Mean (SD) min-max	6 months	12 months	Difference baseline-6 months Mean (SD) min-max *P* value	Difference baseline-12 months Mean (SD) min-max *P* value
Weight (kg)	78.5 (15.6) 45-132	71.2 (13.2) 40.7-119	72.4 (15.9) 42-127	−6.5 (5.4) -21-15 *<.001*	−7.0 (6.3) −26.8-7 *<.001*

categorical variables. For comparisons between more than two groups, the Kruskal Wallis test was used for continuous values, and the Chi-square for categorical values. For comparisons between two groups, the Mann-Whitney *U* test was used for comparisons of continuous variables, the Mantel Haenszel test for ordered categorical values, the Chi square for non-ordered categorical values, and the Fisher's exact test for dichotomous variables. For within-group changes, the Wilcoxon Signed ranks test was used for pairwise comparisons over time. Comparisons between the study group and a healthy control group without dysphagia were performed for known-group validity.

Correlations of the changes between baseline and the 12-month follow-up were calculated using the Spearman correlation coefficient (ρ) to assess convergent validity. To avoid confusion, the Spearman correlation coefficient is hereafter reported as "*r*." $r < .3$ was considered to be a weak correlation, .3-.7 moderate correlation and >.7 a strong correlation.[18]

3 | RESULTS

A total of 142 patients and 115 healthy controls were included in the study. Patients were included if they had completed the MDADI at baseline and at least one more occasion, therefore the number of patients varies between the study occasions. Participant demographics are presented in Table 1. A larger proportion of smokers were found in the patient group (22%) compared to the control group without dysphagia (8%). Comparisons between the included (n = 142) and excluded (n = 108) patients revealed no statistically significant differences regarding age, gender, tumor localization and size, WHO performance status and smoking habits.

Statistically significant weight-loss among the cancer patients was found when comparing baseline and 6 months ($P < .001$) as well as baseline and 12 months ($P < .001$) (Table 3).

3.1 | Longitudinal changes

Table 4 demonstrates the results of the MDADI over time in the study group. In all domains, there were statistically significant deteriorations from baseline to 6 months. The comparison between 6 and 12 months demonstrated statistically significant improvements regarding the Functional, Physical, Global and Total domains. Compared to the control group without dysphagia, the mean values of the MDADI reported by the study participants were inferior at all study occasions. Additionally, the proportion of patients experiencing moderate-severe

dysphagia according to the MDADI threshold value (<60 points) increased significantly over time, starting at 10% at baseline and reached 27% at 6 months, which remained at 12 months.

The study specific items demonstrated statistically significant deterioration between baseline and 6 months regarding 3 of 4 items (Food gets stuck, trouble swallowing because of dry throat and need to rinse down to swallow), see Table 2. The comparison between 6 and 12 months revealed statistically significant improvements in all items except "I have trouble swallowing because of dry throat." When comparing baseline to 12 months, statistically significant deterioration was found in all items. At all study occasions, the study group revealed values inferior to the values of the control group without dysphagia, where all differences were statistically significant. Missing data was low with only 0.5% missing items.

3.2 | MDADI compared to EORTC

Figure 1 demonstrates the changes of the MDADI in comparison to the domains Swallowing and Social eating of the EORTC QLQ H&N35. The changes of the MDADI domains follow the same pattern as the changes of the EORTC; that is, deterioration from baseline to 6 months, with improvement to 12 months, however, still inferior to values of healthy controls and still worse than pre-treatment values.

The correlations of change between baseline and 12 months are found in Table 5. The strongest correlation coefficients were found between the MDADI domains and Swallowing and Social eating domains of the EORTC QLQ H&N35, with moderate correlations found between the MDADI domains and Swallowing (r = −.505 to −.677), moderate to strong correlations were found to the Social eating domain (r = −.595 to −.768). Somewhat weaker, but still moderate, correlations were found between all domains of the MDADI to several of the EORTC QLQ C30 and H&N35 domains (Social contact, sticky saliva, Role function, Emotional function, Social function and Global QOL).

3.3 | MDADI threshold compared to selected domains of the EORTC

Table 6 demonstrates the HRQL values of the EORTC when the MDADI threshold value was applied, that is, the patients were divided at each study occasion according to their respective score of the MDADI total; above or below 60 points, at all study occasions. There were statistically significant differences between the patients with

TABLE 4 MDADI scores before treatment (baseline) and follow-up (6 and 12 months) and a control group without dysphagia. Comparisons of changes within and between groups

	Baseline (n = 142) Mean (SD) min-max	6 months (n = 138) Mean (SD) min-max *P value* compared to baseline	12 months (n = 121) Mean (SD) min-max *P value* compared to baseline/6 months	Control group without dysphagia (n = 115)
MDADI emotional	86.6 (15.7) 33-100	75.9 (20.5) 23-100 *<.001*	78.4 (21.5) 30-100 *<.001/ns*	96.6 (6.2) 67-100
MDADI functional	86.1 (16.4) 32-100	70.7 (17.8) 20-100 *<.001*	75.9 (23.6) 24-100 *<.001/.003*	96.2 (6.8) 76-100
MDADI physical	81.7 (19.0) 33-100	68.1 (17.6) 23-100 *<0.001*	73.8 (19.3) 28-100 *<0.001/<0.001*	98.9 (4.6) 55-100
MDADI global	75.1 (29.5) 20-100	61.2 (29.4) 20-100 *<.001*	73.8 (29.2) 20-100 *Ns/<.001*	99.0 (4.5) 80-100
MDADI total[a]	84.3 (16.2) 38-100	71.1 (17.6) 28-100 *<.001*	75.6 (19.7) 29-100 *<.001/.003*	97.5 (4.4) 64-100
	n (%)	n (%)	n (%)	
MDADI total[a] n (%) below threshold (60 points) indicating moderate/severe dysphagia	15 (10.6%)	38 (27.5%) *<.001*	32 (26.7%) *Ns/<.001*	0 (0%)

Note: For MDADI domains 100 indicates the most favorable state, 20 the least favorable. *P*-value compared to baseline, and at 12 months also compared to 6 months. ns, nonsignificant. Comparison between patients and control group without dysphagia revealed $P < .005$ in all domains of the MDADI and occasions.

[a]The total MDADI total score includes 19 items, omitting the global item.

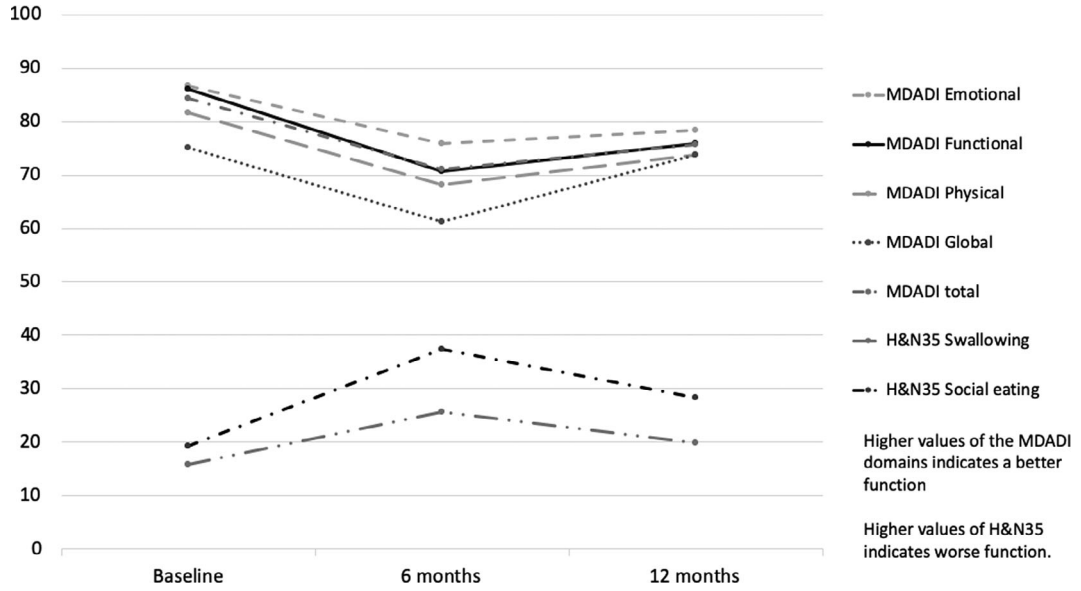

FIGURE 1 Mean values over time during the study year for MDADI domains and total score and the swallowing and social eating domain of the EORTC QLQ H&N35

TABLE 5 Spearman correlation coefficients of the changes between baseline and the 12 months follow-up in the MDADI domains and the selected domains of the EORTC QLQ C30 and H&N35.

	EORTC QLQ H&N35				EORTC QLQ C30			
	Swallowing	Social eating	Social contact	Sticky saliva	Role function	Emotional function	Social function	Global QOL
MDADI emotional	−.505**	−.595**	−.562**	−.365**	.330**	.352**	.421**	.439**
MDADI functional	−.569**	−.643**	−.559**	−.383**	.418**	.331**	.465**	.449**
MDADI physical	−.693**	−.773**	−.412**	−.490**	.591**	.407**	.506**	.582**
MDADI global	−.515**	−.728**	−.483**	−.397**	.509**	.370**	.460**	.447**
MDADI total	−.677**	−.768**	−.544**	−.464**	.512**	.404**	.530**	.555**

Note: <0.3 was considered to be a weak correlation, 0.3–0.7 moderate correlation, and >0.7 a strong correlation.
**Correlation is significant at the .01 level.

moderate-severe dysphagia (<60 points) and no/mild dysphagia (≥60 points) in all selected domains of the EORTC, where the patients with moderate-severe dysphagia experienced inferior HRQL throughout. Dry mouth however, did not reveal statistically significant differences at baseline and 12 months when comparing patients with moderate/severe dysphagia to patients with no/mild dysphagia.

4 | DISCUSSION

This study aimed to evaluate the longitudinal changes of dysphagia-related HRQL of patients with oral carcinoma up to 1 year following oncologic treatment, and to evaluate if the Swedish MDADI was responsive to dysphagia-related HRQL over time. Results showed that the Swedish MDADI achieved statistically significant changes over time, with deteriorations in all domains at 6 months, with improvements at the 12-month follow-up. However, the values at 12 months were still inferior compared to the baseline values and when compared to the values of the control group without dysphagia. Additionally, at all study occasions, the difference between the patients and the control group without dysphagia exceeded the suggested threshold (10 points) indicating a clinically important difference.[15] These results are in line with other studies of patients with HNC, where patients with oral and oropharyngeal tumors demonstrated similar values of the MDADI and with a similar pattern of change over time.[12,19-23] Additionally, the a priori hypothesized correlations of changes over time of the MDADI domains to selected domains of the EORTC QLQ C30 and H&N35 were confirmed, where moderate correlations were found as expected, and with the strongest correlations to Social eating and Swallowing. This indicates convergent validity,

TABLE 6 Results of selected domains of the EORTC QLQC30 and H&N35 for patients divided below or above threshold value of the MDADI total at all study occasions

	Baseline (n = 142)			6 months (n = 138)			12 months (n = 120)		
	<60 points MDADI total (n = 15) Mean (SD) Min-max	≥60 points MDADI total (n = 127)	*P* value	<60 points MDADI total (n = 38) Mean (SD) Min-max	≥60 points MDADI total (n = 100)	*P* value	<60 points MDADI total (n = 32) Mean (SD) Min-max	≥60 points MDADI total (n = 88)	*P* value
EORTC QLQ-C30									
Role function	26.7 (27.3) 0–67	76.1 (33.8) 0-100	<.001	49.9 (33.9) 0-100	69.2 (35.5) 0-100	<.001	53.8 (37.4) 0-100	84.8 (25.1) 0-100	<.001
Emotional function	48.9 (33.2) 0-100	72.6 (22.7) 0-100	.005	55.9 (24.3) 0-100	80.9 (21.0) 8-100	<.001	59.6 (25.9) 0-100)	83.4 (19.7) 25-100	<.001
Social function	53.3 (24.6) 0-100	83.2 (24.6) 0-100	<.001	57.5 (28.9) 0-100	76.4 (25.5) 0-100	<.001	58.3 (32.0) 0-100	85.5 (20.4) 17-100	<.001
Global QOL	40.0 (19.2) 0-75	65.9 (25.7) 0-100	<.001	42.8 (18.0) 0-75	66.5 (22.0) 17-100	<.001	48.4 (22.1) 0-83	73.6 (22.3) 0-100	<.001
EORTC QLQ-H&N35									
Swallowing	51.7 (23.0) 8-100	11.7 (18.5) 0-92	<.001	41.9 (29.6) 0-100	18.4 (20.2) 0-83	<.001	45.1 (26.6) 0-100	11.1 (12.7) 0-100	<.001
Social eating	58.9 (23.9) 25-100	14.6 (18.1) 0-83	<.001	59.2 (28.2) 0-100	27.7 (21.5) 0-100	<.001	57.6 (22.4) 17-92	18.6 (18.1) 0-75	<.001
Social contact	30.2 (18.0) 7-67	4.7 (10.0) 0-53	<.001	30.9 (25.3) 0-80	8.4 (13.5) 0-53	<.001	32.3 (25.6) 0-80	5.2 (10.2) 0-46	<.001
Sticky saliva	42.2 (38.8) 0-100	18.3 (26.2) 0-100	.010	51.4 (33.0) 0-100	36.0 (36.2) 0-100	.017	57.3 (37.1) 0-100	34.1 (32.3) 0-100	.002

Note: For EORTC QLQ-C30 domains a higher value corresponds to a higher, that is, better function. For EORTC QLQ-H&N35 domains a higher value corresponds to a higher symptom burden, that is, worse. Baseline = before oncologic treatment. MDADI total values below 60 points correspond to moderate/severe dysphagia.

and that the Swedish MDADI is sensitive to changes of dysphagia-related HRQL over time.

The threshold value of the MDADI, (<60 points) indicating moderate-severe dysphagia demonstrated that a small proportion of the patients experienced dysphagia at baseline and almost 30% experienced dysphagia at 6 and 12 months. This is a higher prevalence of patients with moderate-severe dysphagia compared to the study by Grant et al who developed the threshold value, where 16% of patients were found to have moderate-severe dysphagia.[11] However, that study was a cross-sectional study where the mean time since completion of treatment was 6.7 years and patients had mostly small tumors of the tonsil or base of tongue, which may explain the difference. The results using the threshold value of <60 points may be of relevance in clinical use, to quickly capture which patients may need to see a swallowing specialist as well as identifying possible candidates for swallowing rehabilitation.

When using the threshold value of the MDADI to classify patients into having either moderate-severe dysphagia or none-mild dysphagia and calculating the results of the selected domains of the EORTC QLQ-C30 and H&N35, statistically significant differences were found in all domains at all study occasions, where patients with moderate-severe dysphagia scored significantly worse throughout. These results are similar to a study by Daugaard et al, who found that QOL was lower in patients with moderate to severe dysphagia compared to patients without dysphagia.[4] This further strengthens the use of this threshold value in clinical praxis.

4.1 | Limitations

This study may be limited by the excluded 108 patients who only completed the MDADI at baseline. However, comparisons of tumor characteristics and other baseline data between included and excluded patients revealed no statistically significant differences. An additional possible limitation may be the fact that not all participants responded to the MDADI at all study occasions. However, as this is the only study using the Swedish MDADI in a longitudinal setting, it still adds important aspects regarding the longitudinal mapping of dysphagia among patients treated for oral tumors. Additionally, missing items were low—at only 0.5%.

5 | CONCLUSION

The Swedish MDADI has been investigated in a large longitudinal study of patients with oral cancer and the instrument was found to be

sensitive to change and shows convergent results when compared to other established HRQL instruments. Additionally, using the previously suggested cut-off value for MDADI, patients with moderate to severe dysphagia were found to experience worse HRQL, which indicates that the threshold value can be used to identify patients in need of further intervention such as swallowing rehabilitation.

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CONFLICT OF INTEREST

None to declare.

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